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THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

SUPPLEMENT 11

Diseases of Cotton, Sugar Cane, Forest Trees, Ornamental and Miscellaneous Plants in the United States in 1919.

June 15, 1920

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

PLANT DISEASE SURVEY

1919

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List of Collaborators of the Plant Disease Survey who have made the principal contribution to the 1919 annual summary.

It should be understood that many other collaborators and pathologists have assisted in gathering data within the states but the following list includes those who actually furnished state reports to the Washington office.

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New Jersey......	Dr. M. T. Cook
New Mexico......	Prof. L. H. Leonian
New York........	Dr. Chas. Chupp
North Carolina..	Dr. R. A. Jehle
North Dakota....	Prof. H. L. Bolley
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Oklahoma........	Prof. C. D. Learn
Oregon..........	Prof. H. P. Barss
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Pennsylvania....	Prof. C. R. Orton
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South Carolina..	Prof. J. L. Seal
South Dakota....	Prof. Manley Champlin
Tennessee.......	Prof. S. H. Essary
Texas...........	Dr. J. J. Taubenhaus
Utah............	Dr. G. R. Hill, Jr.
Vermont.........	Dr. B. F. Lutman
	Prof. A. H. Gilbert
Virginia........	Dr. F. D. Fromme
Washington......	Dr. F. D. Heald
	Mr. B. F. Dana
	Mr. A. M. Frank
West Virginia...	Dr. N. J. Giddings
	Prof. Anthony Berg
	Dr. J. L. Sheldon
Wisconsin.......	Dr. R. E. Vaughan
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DISEASES OF COTTON, SUGAR CANE, FOREST TREES, ORNAMENTALS, AND MISCELLANEOUS PLANTS IN THE UNITED STATES IN 1919

Prepared by

G. Hamilton Martin, Jr.

CONTENTS

Diseases of Cotton 275
Diseases of Sugar Cane 283
Diseases of Forest Trees 288
Diseases of Ornamentals 299
Diseases of Miscellaneous Plants 305

Foreword

The summaries of diseases of cotton, sugar cane, forest trees, ornamentals and miscellaneous plants were prepared from reports of collaborators and specialists in the Office of Forest Pathology and Sugar Plant Investigations, and from data gathered by special surveys - such as that conducted for sugar cane diseases in 1919.

The estimates of losses are in most cases those submitted by the collaborators or specialists.

In the case of forest trees, ornamentals and miscellaneous plants the volume of information at hand in preparing this summary has not been large in comparison with the data available on the more important food crops. The number of specialists engaged in the study of diseases of these plants is small, the average plant pathologist giving them only passing attention. Yet a complete annual summary, based on adequate information, would be of value to every plant disease worker and of special importance to teachers of forestry and landscape gardening, as well as to those giving courses in mycology and plant pathology. It is hoped that fuller reports on diseases of these plants may be secured in the future so that these summaries may become of greater value.

The role of wild plants as carriers of diseases of food crops is too well known to need exposition here. Hence plant pathologists, as well as students in mycological and pathological courses, should make a practice of noting and reporting all diseases observed in the course of field work, no matter how common and unimportant the host may be. In this Supplement it will be noticed that only one state reported rust on the dandelion for 1919, yet this rust has a wide range and is usually common. Full reports year after year on such diseases, although of little apparent importance today, may become of great value in future studies on plant disease geography and related subjects.

Greater attention should also be given to reporting diseases of ornamental and forest trees. Forest trees have a definite value as a crop and produce a definite yearly increment. The destruction of our chestnut forests by chestnut blight is not only causing a great loss, which can be measured in terms of the present stand, but the permanent extinction of the chestnut as a forest tree represents an inestimably greater loss. The shade trees of our dooryards and parks have an economic, social and aesthetic value far above that of the board feet they contain.

COTTON

In comparing the estimates and reports of 1918 and 1919 on the amount of crop injury and losses from the various cotton diseases it appears that on the whole a greater amount of loss from disease occurred in 1919 than in 1918. Throughout the cotton belt in 1919 late spring and early summer rains assisted materially in producing favorable conditions for some of the more serious diseases.

The accompanying chart (Fig. 42) shows the possible total production of cotton in bales, in the principal cotton producing states if there had been no loss through disease during 1919. There is also shown the estimated reduction in the number of bales and the actual production for the same year.

State	Production 1919 (000 omitted)	Reduction 1919 due to diseases
Texas	2700	439
Georgia	1730	460
S. Car.	1475	192
Miss.	946	141
N. Car.	875	154
Okla.	930	92
Ark.	830	72
Ala.	715	97
La.	300	33
Tenn.	298	33
Calif.	102	-
Ariz.	75	25
Mo.	60	-
Va.	22	3
Fla.	17	-
Others	7	-

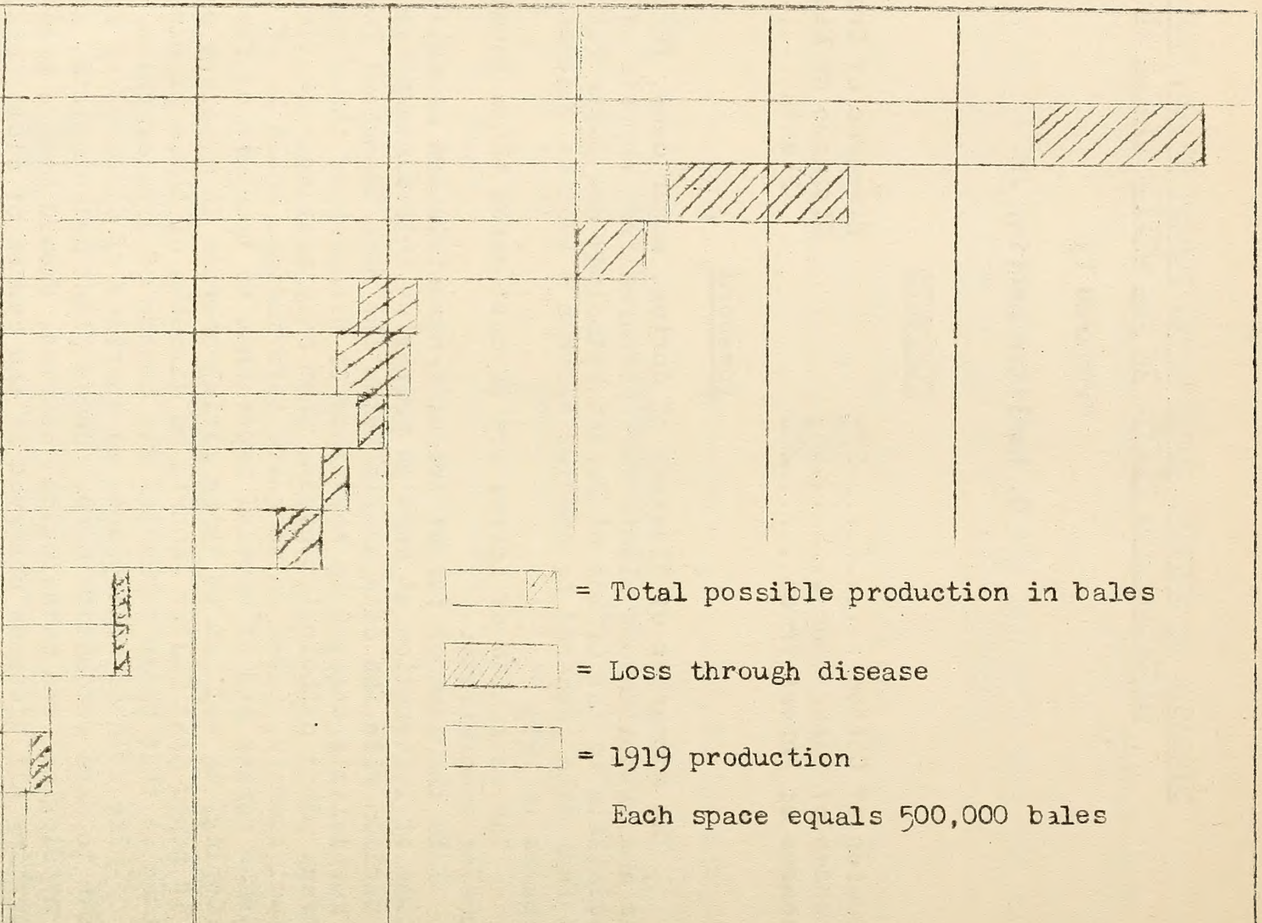


Fig. 42. Production of lint cotton by states, 1919 and reduction in loss from diseases.

Wilt and anthracnose probably caused about the same total losses, but, due to the fact that wilt is confined to sandy soils and anthracnose generally distributed over the entire cotton area, the local wilt losses greatly exceeded those from anthracnose. That is to say, wilt in frequent cases causes from 50-90% loss on sandy soils but because it does not occur on clay soils the average state loss is very materially reduced. Anthracnose on the other hand never causes such severe losses as wilt but because of its quite general occurrence the average for the United States is about the same. Root knot and angular leaf spot were also important. Ozonium omnivorum was important locally in Texas, where it undoubtedly produced more damage than all the other diseases combined. Malnutrition, or "rust", continued to bring about its usual amount of loss in situations where an effort is made to raise cotton on depleted soil.

Anthracnose caused by Glomerella gossypii (South.) Edg.

Anthracnose was reported from Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma and Arkansas.

It was general throughout all the states reporting its occurrence except in Oklahoma, in which state the infection was local. In South Carolina it was very severe in two of the northern counties. In Alabama it was more severe than in 1917 and 1918. In Arkansas it was slight, and in all the other states it was only moderately severe.

The injury in Tennessee was about 25% resulting in an estimated loss of about 8%. In North Carolina the estimated loss was about 5%. In South Carolina the injury ranged between 15 and 20%, the average loss amounting to 3%. In Georgia the injury in local instances reached 50% with the total loss for the state averaging about 8%. In Alabama the loss was about 4%. In Mississippi there was considerable injury resulting in a loss of at least 5%. In Louisiana the injury was considerable - about 2% loss. In Texas the loss was estimated at about 1.5%. In Oklahoma the loss was about 1%. In Arkansas the percent of crop injury was about 20%, which produced a loss of about 1.5% in the state.

The accompanying map shows the estimated percentages of reduction in yield in the various states caused by anthracnose in 1919. These data, together with corresponding losses in bales, computed from estimated production, are given in tabular form in Plant Disease Bulletin Supplement 12, 1920.

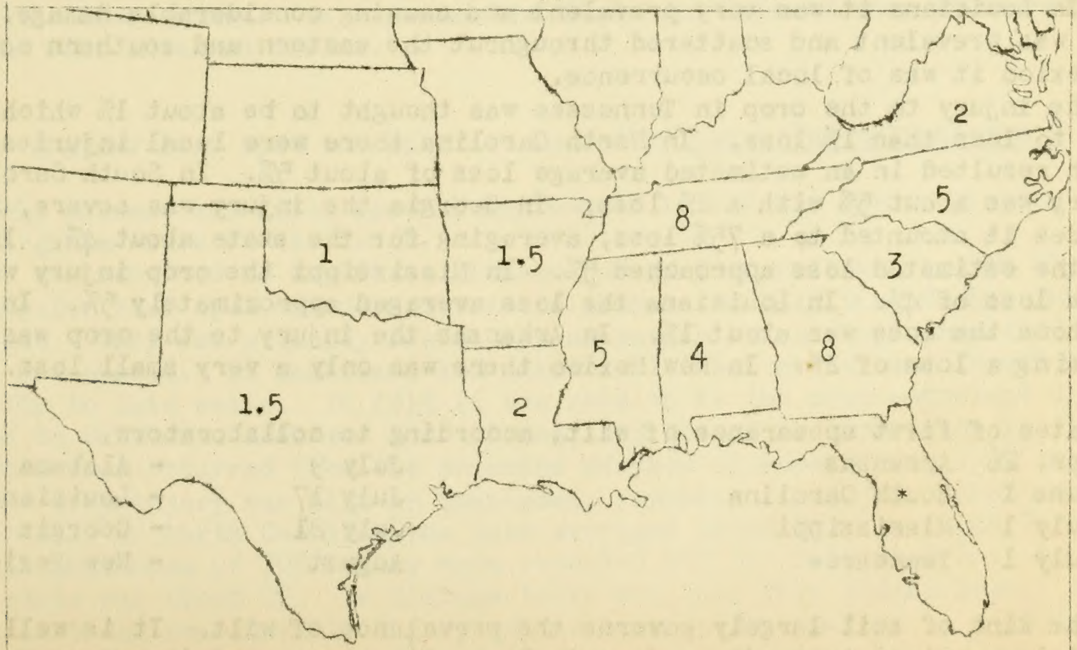


Fig. 43. Estimated percentage reduction in yield from anthracnose of cotton, 1919.

Due to a prolonged rainy season favorable weather conditions for the disease prevailed in all the states except Arkansas. In North Carolina the disease was more prevalent in the coastal counties due no doubt to the fact that more dampness prevailed.

Earliest appearances
May - Arkansas
June 1 - Georgia
July 1 - South Carolina
July - Oklahoma
August 1 - Tennessee
August 25 - Mississippi

When crop rotation was practiced and disease-free seed used satisfactory control was secured in North Carolina. No other reports on the success of control measures were received.

Wilt caused by Fusarium vasinfectum Atk.

Wilt was reported from Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Arkansas and New Mexico.

It was the most important cotton disease in Alabama and Louisiana, and second in Mississippi, Arkansas, South Carolina and Georgia.

New Mexico reported for the first time the occurrence of wilt within the state. It was reported by Leonian from Dona Ana County.

There were severe local losses in Tennessee in the cotton growing sections of the southwestern counties. North Carolina was severely attacked in the eastern half of the state. In South Carolina and Georgia it was prevalent in the Coastal Plain section wherever the growers attempted to grow varieties which were not wilt resistant. In Alabama it was general in the sandy soils, and more common and widespread than in 1918. It was quite severe during the early cotton season in the southern and middle sections. In the northern part where clay soils are found, wilt does not occur. In Mississippi it was quite common in local areas over the state. In Louisiana it was very prevalent and causing considerable damage. In Texas it was prevalent and scattered throughout the eastern and southern counties. In New Mexico it was of local occurrence.

The injury to the crop in Tennessee was thought to be about 1% which amounted to less than 1% loss. In North Carolina there were local injuries of about 50% which resulted in an estimated average loss of about 5%. In South Carolina the injury was about 5% with a 2% loss. In Georgia the injury was severe, in local cases it amounted to a 75% loss, averaging for the state about 4%. In Alabama the estimated loss approached 5%. In Mississippi the crop injury was about 5% with a loss of 4%. In Louisiana the loss averaged approximately 5%. In Texas and Oklahoma the loss was about 1%. In Arkansas the injury to the crop was near 20%, causing a loss of 2%. In New Mexico there was only a very small loss.

Dates of first appearance of wilt, according to collaborators.
Apr. 26 Arkansas
June 1 South Carolina
July 1 Mississippi
July 1 Tennessee
July 9 - Alabama
July 17 - Louisiana
July 21 - Georgia
August - New Mexico.

The kind of soil largely governs the prevalence of wilt. It is well known that wilt is confined to sandy, and sandy loam situations, and does not occur on clay soils except in rare instances.

The accompanying map shows the estimated percentage of reduction in yield in the various states caused by wilt in 1919. These data together with corresponding losses in bales computed from estimated production are given in tabular form in Plant Disease Bulletin Supplement 12, 1920.

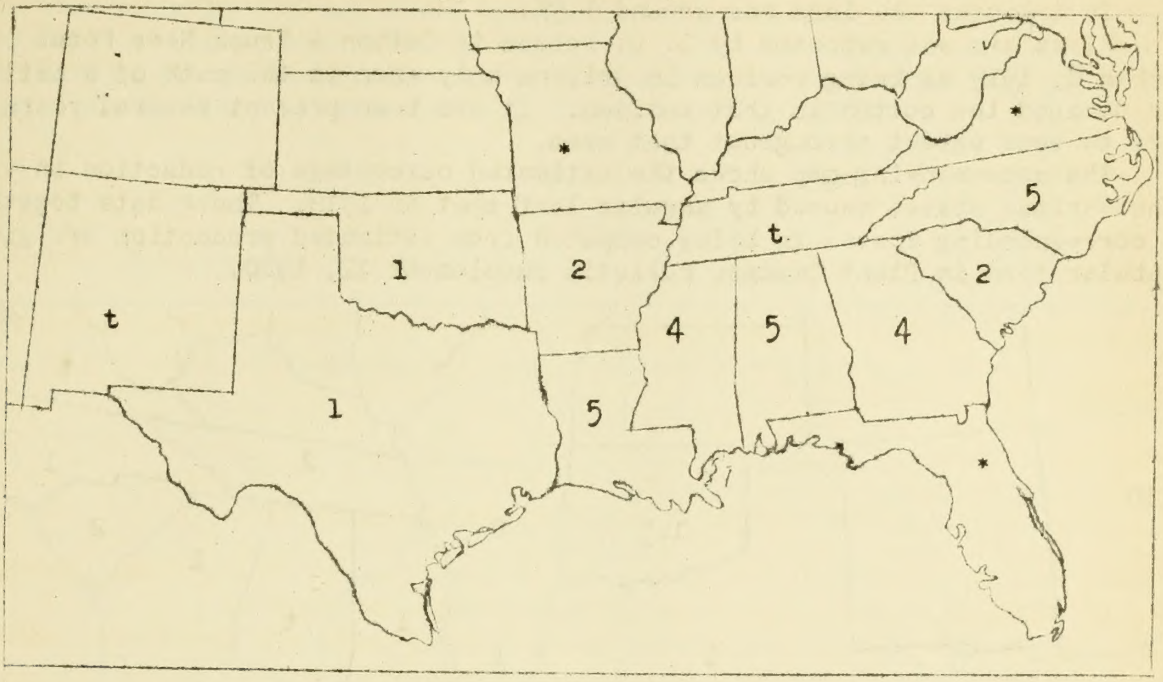


Fig. 44. Estimated percentage reduction in yield from wilt of cotton, 1919.

Very little wilt was experienced in North Carolina when wilt resistant varieties, such as Dixie, were used. In South Carolina, Dixie, Dixie Triumph and Dixie Cook - wilt resistant varieties - gave good results. In Louisiana, in Beauregard Parish, several fields which had been planted to commercial varieties showed about 25% infection, while three wilt resistant varieties (names not given in report) planted on a field which had previously shown 65% showed only $\frac{1}{4}$% infection. In Madison, Ouachita and Caddo Parishes the varieties Minden, Selection A, and Hybrid 143 - all wilt resistant cottons - showed from none to 3% infection in checks with other cotton. In Arkansas the Dixie and Express were successfully planted in wilt infested fields.

Angular leaf spot and boll rot caused by *Bacterium malvacearum* E.F.S.

This disease was quite general and common in all the cotton growing states except Virginia where it was local.

It was reported to the Plant Disease Survey from Arizona for the first time.

Angular leaf spot was more severe in Alabama in 1919 than during the previous seasons. This was probably due to the excessive rains which prevailed throughout July and August. In Louisiana and Arkansas it was severe, due in all probability to late rains. In 1919 it was said to be the most important disease of cotton in Oklahoma, Arkansas and Arizona, and second in importance in Tennessee.

More loss occurred from the presence of this disease during 1919 than in 1918. The crop injury ran high in Tennessee, reaching about 50%, which amounted to a loss of 2%. In North Carolina the loss averaged about 1%. In South Carolina individual instances of 70% injury were reported but the estimated loss to entire crop in state was about 2%. In Alabama there was only very slight loss. In Mississippi there was considerable injury to the crop which resulted in a 1% loss.

In Louisiana injury ran high although the loss at the end of the season was around 1%. In Texas the estimated loss was 1%. In Oklahoma the loss was about 1.5%. In Arkansas the loss was around 1.5%.

Black arm was reported by L. O. Watson in Cotton & Truck News Notes November 8, 1919 as being serious in Arizona only when in the path of a hail storm which damaged the cotton in that section. It has been present several years and occurs to some extent throughout that area.

The accompanying map shows the estimated percentage of reduction in yield in the various states caused by angular leaf spot in 1919. These data together with corresponding losses in bales computed from estimated production are given in tabular form in Plant Disease Bulletin Supplement 12, 1920.

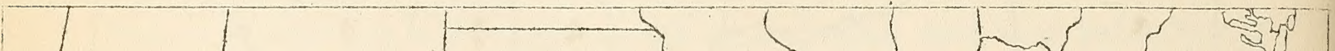


Fig. 45. Estimated percentage reduction in yield from angular leaf spot of cotton, 1919.

Earliest appearances
May - Arkansas
May 25 - Tennessee
June - Oklahoma
June 19 - Alabama
June 26 - Virginia.

No new methods or measures for control were reported to the Survey during 1919.

Root knot caused by Heterodera radicicola (Greef.) Müll.

The range of root knot was practically that of 1918. It was reported from South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma and Arkansas.

The disease was of common occurrence in South Carolina, Texas and Arkansas. In Louisiana it was local. In Georgia general in the southern half of the state.

There was only a slight amount of root knot in Tennessee. In North Carolina an estimated loss of 1% was reported. In South Carolina the injury ranged from 0 to 100%, causing a loss of about 1.5%. In Georgia the loss was estimated at 4%. In Alabama and Mississippi the losses averaged about 2%. In

Louisiana the crop injury was slight and the loss 1%. In Texas and Oklahoma the loss was about 5% and in Arkansas a trace.

The accompanying map shows the estimated percentage of reduction in yield in the various states caused by root knot in 1919. These data together with corresponding losses in bales computed from estimated production are given in tabular form in Plant Disease Bulletin Supplement 12, 1920.

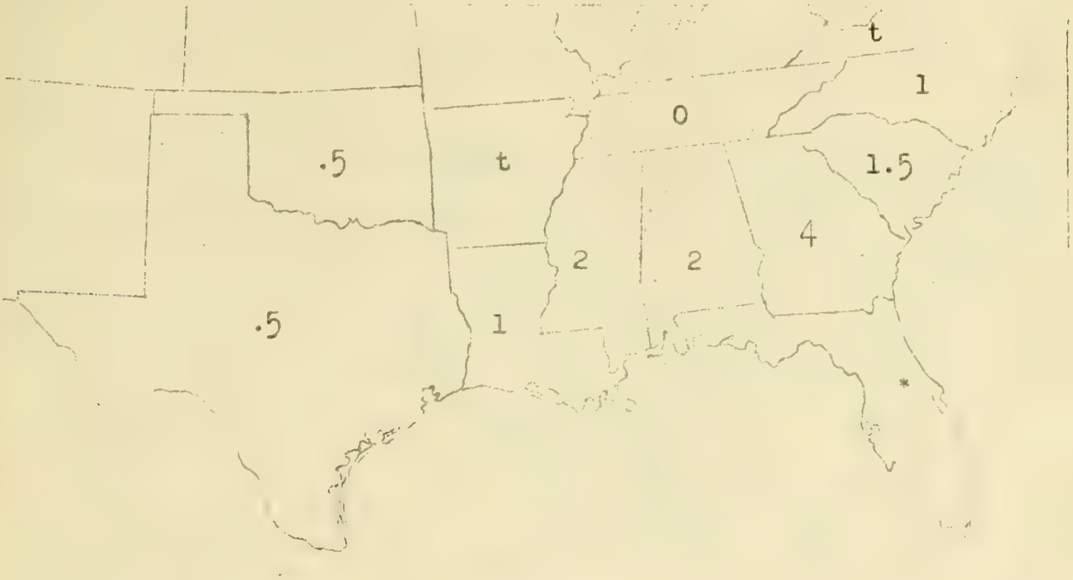


Fig. 46. Estimated percentage of reduction in yield from root knot of cotton, 1919.

Rotations of one to three years with root knot immune crops constitute the best method of control. Since wilt frequently, if not usually occurs on root knot infested lands, the use of wilt-resistant varieties of cotton is always advocated for such fields. J. A. McClintock stated that in Georgia root knot was serious on infested soil where susceptible varieties of crops had been grown without rotation, but that a fairly good crop of cotton could be grown for one year on soil that had been badly infested for the past several years where resistant varieties had been used and crop rotation practiced.

Root rot caused by Ozonium omnivorum Shear

Root rot was reported during 1919 from Texas, Oklahoma, Arkansas and Arizona. It was reported from the additional state of New Mexico in 1918.

The disease was general in the cotton areas of Texas and Oklahoma, also in the southern boundary tier of counties of Arkansas.

The epidemic in Texas resulted in a loss of about 10%. In Oklahoma the loss ran as high as 25% in local fields while the estimated average was about 3%.

Malnutrition (non-parasitic)

Malnutrition, known locally in certain localities as rust, was reported from Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana and Arkansas.

It was prevalent in the cotton districts of North Carolina and South Carolina and locally in Alabama, Mississippi and Louisiana.

The type of soil appeared to affect the severity and distribution of the disease in Arkansas as considerably more injury was found on the impoverished soil - such as slate soils, coarse sandy soils and river bottoms - than on that which contained the necessary plant food requirements. In Georgia where large losses occurred in 1918, favorable weather conditions with the use of more potash in the fertilizers improved the situation. It was not observed in the places where it was so prevalent in 1918. In North Carolina many fields were enriched by adding humus, stable manure and potash. These additions were found to act favorably.

The injury and estimated crop losses in North Carolina amounted to about 3%. In South Carolina the injury was between 25 and 30% with a loss of about 1-2%. In Arkansas a loss of about 2% took place.

The accompanying map shows the geographical distribution of root rot.

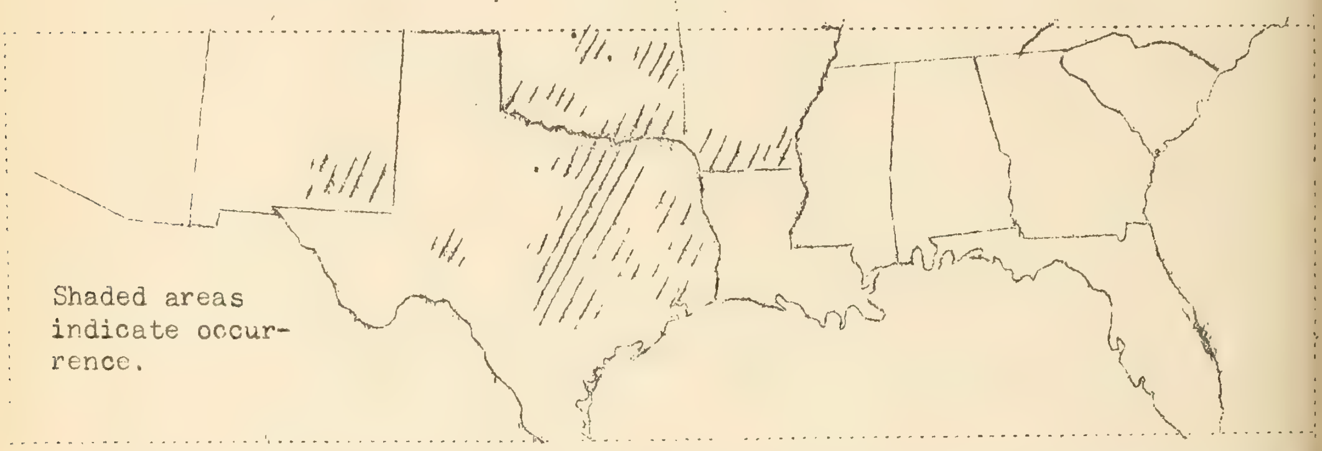


Fig. 47. The present known geographical distribution of Ozonium omnivorum on cotton according to records of the Plant Disease Survey.

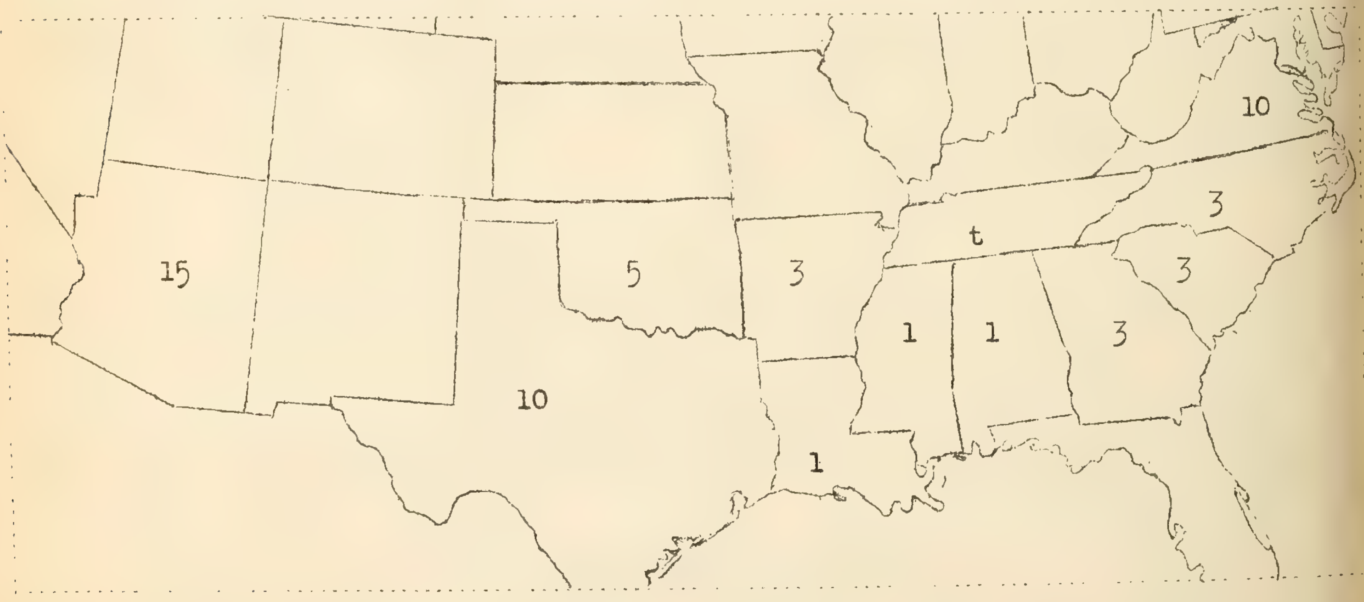


Fig. 48. Estimated percentage reduction in yield from all diseases other than anthracnose, wilt, angular leaf spot and root knot. Among the diseases concerned are root rot, caused by Ozonium, sore shin, etc., caused by Rhizoctonia, and miscellaneous leaf spots and boll rots.

Leaf spot caused by Cercospora gossypina Cke.

This very common disease of cotton occurred generally but was only reported to the Survey from South Carolina, Texas and Oklahoma. In South Carolina it was local. In Oklahoma it was somewhat scattered over the state, appearing in seven counties. In Texas it was prevalent. Plenty of moisture in Oklahoma afforded a favorable growing condition for the causal organism. In many cases it followed angular leaf spot but in some fields the organism itself appeared to have caused the leaf injury and where such seemed the case, the infection was bad.

Sore shin caused by Rhizoctonia sp.

Sore shin was reported from Virginia, Georgia, Alabama, Texas and Arizona. The disease was local in all these states except Georgia where it was said to be general. In Virginia the disease was severe early in June in Greensville and Brunswick Counties. This necessitated the plowing up of some crops and replanting many of the fields. The trouble disappeared largely as the season advanced. In Georgia the crop injury ran as high as 50% causing individual estimated losses of about 10%. In Texas there was practically no loss. In Arizona there was a 10% loss to the young crop in the early part of the season which required a replanting in most sections of the state. Considerable rains furnished favorable weather conditions.

Earliest report June 6, in Georgia.

Alternaria leaf spot caused by Alternaria sp.

Alternaria leaf spot appeared in South Carolina (local) and in Arkansas (followed Bacterium malvacearum which destroyed much of the foliage). The weather conditions were unfavorable to the disease in South Carolina.

Other diseases

Boll rot caused by Diplodia sp., and other fungi was reported general in Arkansas, but not severe. A 1% crop injury was reported. Earliest report was in September.

The rotting of bolls caused by wet weather was reported from Tennessee, Mississippi and Oklahoma. In Tennessee the seed sprouted and the lint was badly damaged by the rain. In Mississippi the rotting of the seed caused considerable alarm as it affected the planting supply of staple seeds for 1920.

Lightning injury was reported by D. C. George as occurring in Arizona. He has provided the following interesting statement:

> "It is a matter of common knowledge to cotton growers of the southern states that cotton fields are liable to injury by lightning. What appears to be an injury of this type has recently been investigated by this office. A field located 10 miles southeast of Phoenix near the foothills exhibited a characteristic lightning injured spot. The spot is located on the north side of the field and is approximately 100 yards south of an irrigation canal. When visited by the writer a dozen or more plants in the center of the spot were completely killed. The dead plants presented a scorched or burned appearance and none of the leaves had been shed. The plants adjoining were not completely killed but showed evidence of severe injury. This injury is characterized by a partially burned or scorched

appearance of the foliage as a distinct chocolate brown color of the stems, branches and leaf petioles. This color extends from a point 6 or 8 inches from the growing point of the various parts to the surface of the soil. Examination of the cambium, or the layer between the bark and woody part of the plant, reveals a dark brown or black color extending the entire length of the chocolate colored area. No discoloration of this layer was apparent in the parts of the stems below the soil surface or in the roots. The most striking effect was the peculiar flattened and twisted condition of the stems and other parts at the points where the electrical charge apparently entered the plant. Often the parts struck would droop at the point of entrance but seldom was there a wilting of the terminal portions beyond this point. In fact in most instances a normal color prevailed among the terminal portions and the plant had every indication of continuing growth. No difficulty was experienced in detecting injured from non-injured plants, as the chocolate colored area was not apparent on the latter plants. The area over which the stroke distributed itself was nearly circular in outline, the greater diameter being approximately 120 feet. Dead plants only occupied the exact center of the spot, the injury diminishing toward the periphery."

SUGAR CANE

Mosaic (cause undetermined)

On account of the seriousness of the mosaic disease of sugar cane, a survey was conducted by the Office of Sugar Plant Investigations throughout the southern sugar cane belt to ascertain the extent and seriousness of the disease.

Table 38. Counties and number of localities visited by field men engaged in the sugar cane survey, 1919.

State	County	No. of districts visited	State	County	No. of districts visited
Alabama	Baldwin	1	Florida	Putnam	1
	Mobile	1		Suwanee	2
				Taylor	1
Florida	Columbia	1		Alachua	3
	De Soto	1		Madison	1
	Duval	1		Polk	1
	Escambia	2		Dade	1
	Gadsen	11			
	Leon	1	Georgia	Charlton	2
	Liberty	1		Grady	5
	West Palm Beach	2		Thomas	2
	Jackson	2		Lowndes	1
	Jefferson	3		Ware	1

State	County	No. of districts visited	State	County	No. of districts visited
Georgia	Wayne	1	Louisiana	Plaquemines	7
	Pierce	1		Pointe Coupe	7
	Clinch	1		Rapids	5
				St. Charles	10
Mississippi	Harrison	1		St. James	14
	Jackson	1		St. John The Baptist	12
	Jefferson	1		St. Landry	8
	Adams	1		Tangipahoa	1
				Terre Bonne	2
Louisiana	Ascension	5		Vermillion	2
	Assumption	1		Orleans	2
	Avoyelles	1		Iberia	2
	East Baton Rouge	1		St. Martin	3
	West Baton Rouge	9		St. Mary	1
	West Filiciana	1			
	Iberville	5	Texas	Brazos	1
	Jefferson	1		Brazoria	1
	Lafayette	4		Fort Bend	1
	Lafourche	4		Wharton	1

In connection with this survey all other diseases affecting cane were noted, and, in this way, much valuable information of a general nature was collected. These data were made available to the Plant Disease Survey, and this summary is based mostly on the reports of the survey men. Data were gathered in Georgia, Florida, Alabama and Louisiana and each state in the district of the greatest production of sugar cane was surveyed. The following map and table preceding will show approximately the territory covered and will give a fair idea of the number of counties entered and the districts in each county surveyed.

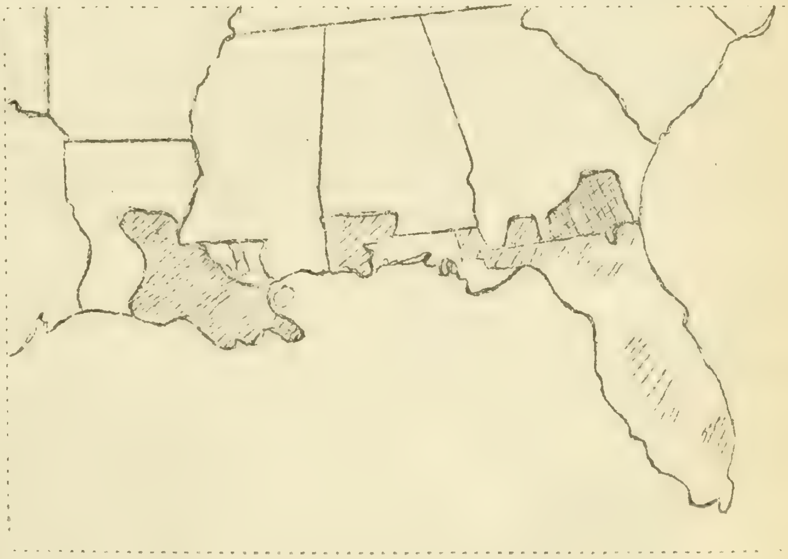


Fig. 49. Map showing the approximate location of areas covered by field assistants on sugar cane disease survey, 1919.

Mosaic was found to be present in Georgia, Florida, Alabama, Mississippi and Louisiana by field assistants on the sugar cane survey under the direction of Dr. E. W. Brandes, pathologist, Sugar Plant Investigations, and in Porto Rico. These findings were the result of considerable survey work in the southern states. The disease was most abundant in Louisiana.

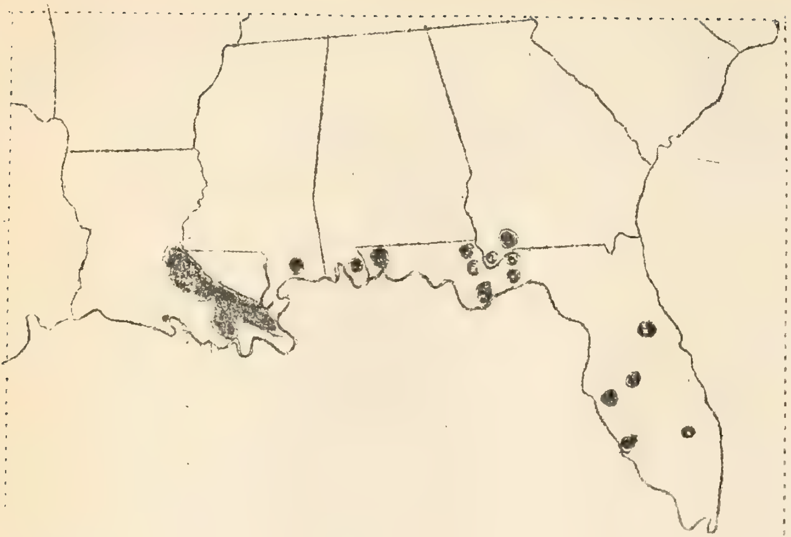


Fig. 50. Map showing the location of areas of sugar cane infected with mosaic. (U.S.D.A. Bul. 829 Fig. 1, p. 5.)

The most heavily infested large area in Louisiana, and consequently in the United States, is between Hutcher and Reserve, where about 75% of the plants on every plantation were infected. The amount ranged from 4-30% from this district to New Orleans and from New Orleans to the lower extremity. In the Bayou-Lafourche district 1-8% of the plants were infected.

In the vicinity of Cairo, Georgia (Grady County) the infection ranged from less than 1% to 75%, or more, in fields where the disease was present. So far the infected plants are confined to the farms on the highways leading out of Cairo.

In Florida the two principal infection areas were located at Mariana and Bristol. Purely local infections were found at Apalachicola, Tallahassee, Punta Gorda, Palmetto, De Land, Winterhaven, Chattahoochee, Muscogee and Canal Point. In Alabama it was found at only one place, that in Baldwin County just over the line from Muscogee, Florida. In Mississippi, it was found at Biloxi, the only point in the state.

The loss in Georgia was from 1-5%. In Louisiana the loss was considerable.

Resistant strains in Georgia and Florida were the Japanese varieties, while the green chewing corn was the most susceptible. In Louisiana in the test plots at Audubon Park, New Orleans the head seedlings 1646, 1606, 1674 and 1797 appeared to be immune. The varieties which are common in the state and which proved to be very susceptible were Louisiana Purple, Louisiana Striped, D74, D95, L511, L218, L219, L226, L231 and L253.

Root rot caused by *Marasmius plicatus* and other fungi.

Root rot was reported from Georgia and Louisiana. The disease was abundant throughout Louisiana as shown in Fig. 51. Due to the extreme wet condition during 1919 the disease was not as severe as in 1918. The crop injury ranged between 5 and 10%, which resulted in considerable loss.

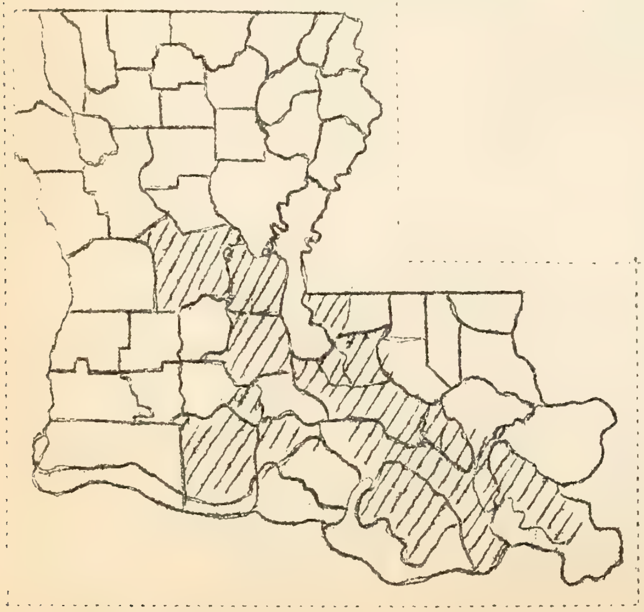
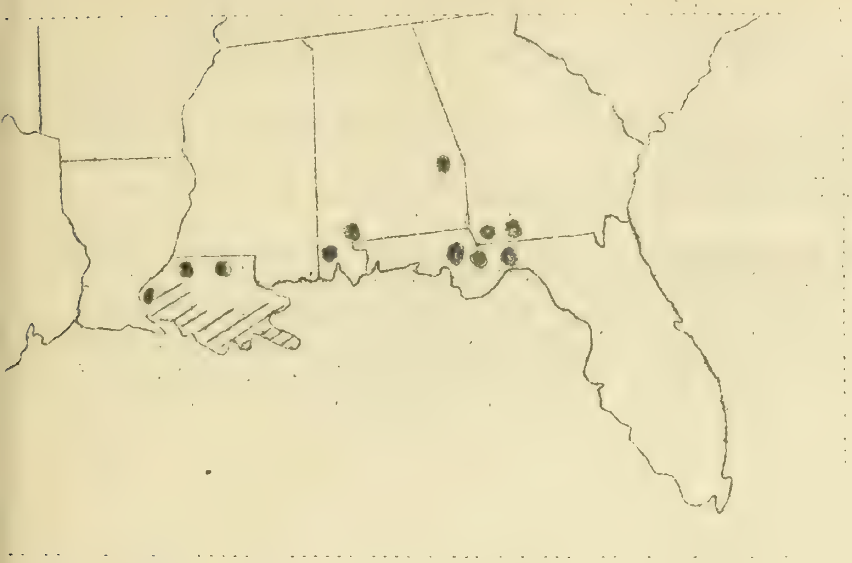


Fig. 51. Map of Louisiana showing the counties in which root rot (*Marasmius plicatus* Wak.) and other fungi were found by field assistants on the sugar cane survey, 1919.

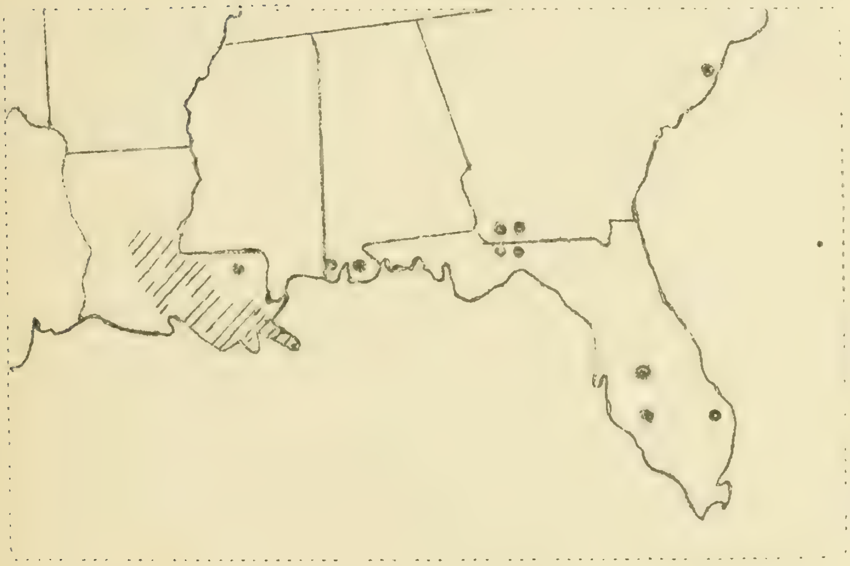
Red rot and red stripe caused by Colletotrichum falcatum



Red rot and red stripe were reported from Georgia, Florida, Alabama, Louisiana and Texas. In Louisiana the disease was prevalent. In Alabama it was abundant.

Fig. 52. Showing the location of areas of red rot in the southern cane belt.

Sheath rot caused by Sclerotium rolfsii Sacc.



Sheath rot was reported from Georgia, Florida, Alabama and Louisiana. As shown in Fig. 53 it was very prevalent over a large area in Louisiana. In the other states in which it was found it was mostly of local occurrence. In Georgia there were occasional losses of as high as 5%. In Louisiana there were local high crop injuries but practically no losses. In other states reporting the losses were slight.

Fig. 53. Showing the location of areas of sheath rot in the southern cane belt.

Other Diseases

Leaf spot or ring rot caused by Leptosphaeria sacchari Van B. de H. was general in Alabama, where it brought about considerable loss.

Root knot caused by Heterodera sp. was present in Georgia and Florida. In Georgia the nematode was of general prevalence. The crop injuries ranged from 0-50% in cases of local infestations. The estimated loss averaged about 1%.

Pineapple disease caused by Thielaviopsis paradoxa De Seynes and Hohn was reported to have been occasionally present in Louisiana. The injury and loss were small. This was also the cause of poor germination in Dade County, Florida, in a few fields. (E.W.B.)

Smut caused by Ustilago sacchari Rab. was reported from New Mexico (Toos County).

Leaf spot caused by Cercospora longipes Butler was reported from Alabama (present in Escambia and Mobile Counties).

Leaf spot caused by Helminthosporium sacchari common in southern Georgia and northern Florida. (E.W.B.)

Rind disease caused by Melanconium sacchari abundant in all cane regions but no damage except to over-ripe cane in southern Florida. (E.W.B.)

Wrinkled top, cause unknown. As much as 5% of plants affected in some fields in Louisiana, Georgia and Florida. The growing point becomes twisted and distorted, and the new leaves are much wrinkled and shredded. Cane ceases to grow. (E.W.B.)

DISEASES OF FOREST TREES.

The following summary of forest tree diseases for 1919 was prepared from reports received by the Plant Disease Survey from state collaborators, from J. F. Collins and G. F. Gravatt, of the Office of Forest Pathology, and from S. B. Detwiler, of the Office of Blister Rust Control. Dr. Collins' initials appear in connection with his reports.

ASH (Fraxinus spp.)

A leaf blight, cause unknown, was reported from Forest Grove, Oregon.

Leaf spot, caused by Cercospora fraxinites E. & E., was reported from Texas as quite prevalent but unimportant.

Rust, caused by Puccinia fraxinata (Lk.) Arth., was more prevalent than usual in Connecticut, causing some leaf defoliation where abundant along the coast. It was of slight importance in Minnesota and Ohio.

ASH, Mountain (Sorbus sp.)

Rust, caused by Gymnosporangium cornutum (Pers.) Arth. (Roestelia cornuta (Pers.) Fries.), reported from Connecticut of uncommon occurrence.

BEECH (Fagus sp.)

Microstroma sp. was reported on Fagus americana in Illinois and on Fagus sp. in New Jersey.

Gloeosporium fagi (D. & R.) West., present in Connecticut. (J.F.C.)

Phyllosticta fagicola E. & M. present in New Jersey and P. fraxini E. & M. in Missouri.

BIRCH (Betula sp.)

Canker, caused by Sphaeropsis conglobata Sacc., occurred in Ohio.

Melanconium betulinum Schn. & Kze. present in Illinois on B. alba. (J.F.C.)

Phyllosticta betulina Sacc. present in New York on B. alba (J.F.C.)

BOX ELDER (Acer negundo)

Canker, caused by Nectria cinnabarina Fr., occurred in Ohio.

Sap rot, caused by Polystictus hirsutus Fr., occurred locally in Minnesota.

BUCKTHORNE (Rhamnus spp.)

Rust, caused by Puccinia coronata Cda., was reported on Rhamnus sp. in Vermont (earliest report July 15) and on Rhamnus alnifolia (first report May 30); and Rhamnus cathartica L. in Minnesota (first report on May 28 in Marshall County, later reported in Clay County). In Marshall County, Minnesota, a young hedge was found very heavily infected, while an old hedge nearby was only slightly infected. (See also leaf rust of oats Pl. Dis. Bul. Sup. 8, 1920.)

BUTTERNUT (Juglans cinerea)

Spot, caused by Gnomonia leptostyla (Fries.) Ces. & De Not. (Marssonia juglandis (Lib.) P. Magnus), reported from Iowa. A trace found.

CAMPHOR (Cinnamomum camphora)

Anthracnose, caused by Gloeosporium camphorae Sacc., reported from Baldwin County, Alabama, and Bell County, Texas (trace).

Canker, caused by Diplodia sp., a trace in Harris County, Texas.

CATALPA (Catalpa sp.)

Leaf spot, caused by Macrosporium catalpae E. & M., was reported from Rhode Island, Connecticut, (more evident than usual, three reports from New Haven County and one in Hartford County), Indiana (found in Marshall County June 23 - weather conditions favorable to the disease).

Leaf spot, caused by Phyllosticta catalpae E. & M., was present in New York, New Jersey (common at times causing heavy leaf fall), West Virginia, South Carolina (common, injury to trees about 60%,- found in Oconee and Greenwood Counties), Ohio (present in Cuyahoga, Wayne, Holmes, Tuscarawas, Morrow, Licking and Franklin Counties, earliest report June 19).

Heart rot, caused by Polystictus versicolor Fries., reported from Wayne County, Ohio.

Leaf wilt, caused by Sclerotinia sp., occurred in Ohio.

Sap rot, caused by Stereum versicolor Fries., was reported from Wayne County, Ohio.

Wilt, cause undetermined, was noticed in Wayne County, Ohio.

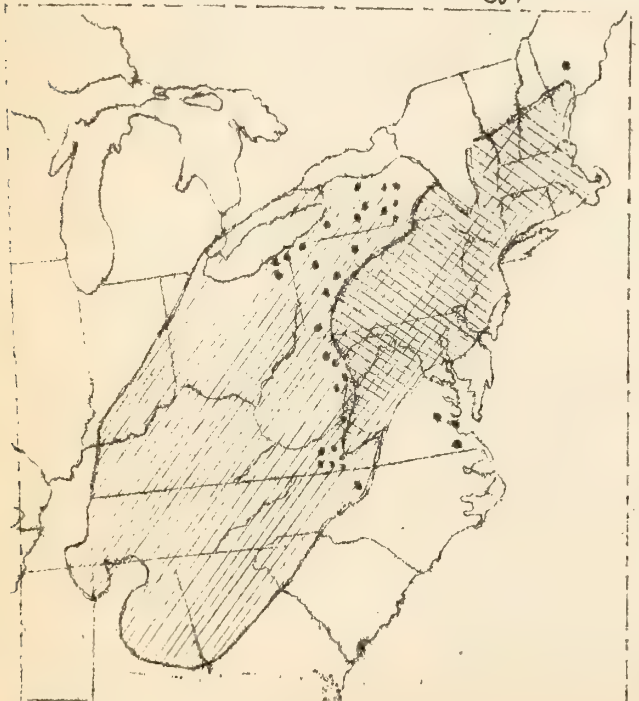
CEDAR (Thuja sp.)

Blight, caused by Keithia thujina Durand, reported from Lewis County, Washington.

Pestalozzia funerea Desm., present in Mississippi on T. occidentalis (J.F.C.)

CHESTNUT (Castanea sp.)

Blight, caused by Endothia parasitica (Murr.) And. (Prepared by G. F. Gravatt, Office Forest Pathology)



▨ Area of general infection.
∴ Spot infection.
▨ General range of chestnut.

As shown by the map the chestnut bark disease extends in the native growth from Maine to North Carolina and west to Ohio. Observations and state reports show that the disease is steadily spreading southward and westward. In the northern part of Virginia approximately 90% of the chestnut trees are at present diseased while in this region five years ago not over 1% of the trees were infected. No indications of any decrease in the virulence of the disease have been noted so far. The chestnut growth of the Southern Appalachians apparently will be killed just as the growth from Maine to Southern Virginia is now dying.

In Alabama two infections on nursery trees shipped into the state were found by state authorities and destroyed. The continuation of the development of commercial chestnut orchards in regions outside of the range of the native chestnut is largely dependent upon whether state authorities keep nurseries that harbor this disease from shipping trees. In many cases the early stage of infection with the bark disease is impossible of detection by field inspection, therefore, no tree grown in an infested nursery is safe to be shipped into new territory. (G. F. Gravatt, March 1920)

Black canker, caused by Melanconis modonia Tul., occurred in Ohio.

Leaf spot, caused by Marssonia ochroleuca B. & C., reported from Ohio of normal prevalence in Ashland, Knox, Morrow, Stark, Tuscarawas and Wayne Counties.

DOGWOOD (Cornus spp.)

Canker, caused by Phoma corni Fckl., reported from Minnesota on cultivated dogwood in Kandiyohi County. Earliest report April 15.

Powdery mildew, caused by Phyllactinia corylea (Pers.) Karst., reported from Washington. Earliest report September 24 at Pullman.

Phyllosticta corni West., present in West Virginia. (J.F.C.)

ELDER (Sambucus spp.)

Powdery mildew, caused by Microsphaera grossulariae (Wal.) Lev. reported from Minnesota. Earliest report August 24, Ramsey County.

Rust, caused by Puccinia bolleyana Sacc. (Aecidium sambuci Schw.), occurred in Ohio.

ELM (Ulmus spp.)

Black spot, caused by Dothidella ulmi Duv., reported from Virginia, Tennessee, North Carolina, Ohio and Nebraska. (Present in Seward County, Nebraska)

Leaf spot, caused by Gnomonia ulmea (Sacc.) Thüm., reported from Nebraska and Minnesota. In the former it was quite common over the state. Earliest report in August. Favorable weather conditions for the disease due to quantity of moisture.

Branch canker, caused by Nectria cinnabarina (Tode) Fr., occurred in Massachusetts and Ohio.

Multiple bud, caused by Fusarium sp., occurred in Ohio.

Root rot, caused by Ozonium omnivorum Shear, was general in Texas. Estimated loss about 1%.

Leaf spot, cause unknown, reported from Kansas. Prevalent in Riley County, local in Sedwick County. Earliest report July 28.

HAWTHORNE (Crataegus spp.)

Rust, caused by Gymnosporangium clavariaeforme (Jacq.) D. C., reported from Massachusetts and Madison County, Alabama. Estimated loss slight. Gymnosporangium clavipes C. & P. (Roestelia aurantiaca Peck.), was more prominent than usual in Connecticut. Reported from Fairfield and Tolland Counties. Gymnosporangium globosum Farl., reported from Minnesota. Present in eight counties. Severe in Rice and moderately severe in Ramsey and McLeod Counties. Gymnosporangium juniperi-virginianae Schw., reported from Iowa by A. L. Bakke to have been found at Clarinda, June 11. Gymnosporangium sp. was reported from Illinois.

HICKORY (Carya spp.)

Anthracnose, caused by Gloeosporium caryae E. & D., occurred in South Carolina (common, producing about a 40% crop injury) and in Ohio.

Leaf mildew, caused by Microstroma juglandis (Ber.) Sacc., reported from

Orange County, Indiana, May 28.

HONEY LOCUST (Gleditsia sp.)

Powdery mildew, caused by *Sphaerotheca* sp., occurred in Ohio.

HORSE CHESTNUT (Aesculus hippocastanum)

Leaf blotch, caused by *Guignardia aesculi* (Pk.) Stewart (*Phyllosticta paviae* Desm.) (*P. sphaeropsidea* E. & E.), reported from New Hampshire, Connecticut, New York, New Jersey, Delaware, Virginia, Ohio, Indiana and Iowa. Common and causing a considerable amount of defoliation in most states.

Earliest reports - May 29, Indiana
July 22, Connecticut
September 15, Ohio.

JUNEBERRY (Amelanchier spp.)

Brown rot, caused by *Sclerotinia fructigena* (Pers.) Schr., reported from Ohio, present in Wayne County.

Leaf spot, caused by *Dimerosporium collinsii* (Schw.) Thüm., reported from Minnesota. (Earliest report April 25)

JUNIPER (Juniperus spp.)

Rust, caused by *Gymnosporangium* spp. (See apple rust, Pl. Dis. Bul., Sup. 9, 1920.)

LARCH (Larix sp.)

Valsa abietis Fries, reported from Ohio.

LOCUST, Black (Robinia sp.)

Leaf spot, caused by *Septoria curvata* (R. & B.) Sacc., occurred in Ohio.

MAGNOLIA (Magnolia spp.)

Anthracnose, caused by *Colletotrichum* sp., was common throughout South Carolina, affecting about 50% of the trees.

Blossom blight, cause bacterial, was reported from King County, Washington. (Earliest report April 29)

Leaf spot, caused by *Spegazzinia ornata* Sacc., reported from South Carolina, occurring in Beaufort, Charleston and Clarendon Counties. Severe in all cases.

MAPLE (Acer spp.)

Anthracnose, caused by *Gloeosporium apocryptum* E. & E., reported from New Hampshire (in Grafton County), Connecticut (apparently more prevalent than usual), Delaware, Oklahoma (in Garvin, Jefferson, Logan, Oklahoma and Payne Counties), Ohio (in Ashtabula and Cuyahoga Counties).

Earliest reports - June 17, Connecticut
June 19, New Hampshire
July, Oklahoma
August 1, Ohio.

Bark canker, caused by Cytospora sp., reported from Washington, where it apparently was the cause of death of street trees in Spokane.

Black specked leaf spot, caused by Rhytisma punctatum Fries., reported from South Carolina (in Greenwood and Oconee Counties), Ohio (in Clermont and Wayne Counties) and Minnesota (more or less common throughout state). Earliest reports - September 17, Ohio and September 24, Minnesota.

Leaf spot, caused by Phyllosticta spp., was reported from Connecticut, Ohio (P. acericola C. & E.) and Minnesota (P. minima (B. & C.) E. & E.).

Winter injury reported from Defiance and Richland Counties, Ohio.

Leaf scorch (non-parasitic) was reported from New Jersey, Ohio (quite prevalent) and Illinois. H. W. Anderson has furnished the following statement regarding this disease in Illinois:

"LEAF SCORCH OF HARD MAPLES IN ILLINOIS

"During the month of May, a serious leaf scorch of maples appeared in many localities in Illinois. This disease has attracted considerable attention and numerous inquiries have been received in regard to the possibility of it spreading to the healthy trees.

"Symptoms:- There are a number of types of the disease, all of which may appear in a single locality, but on a single tree the character of the injury is much the same. When slightly affected, the leaves show a mottled appearance on the upper surface with no dead areas. The under surface is bronze colored and does not show the distinct mottled appearance of the upper surface. In a more advanced stage the leaf area dies, the leaf becomes distorted, showing a curled or cup appearance. Parts of the tissues remain alive for some time, taking on a darker green color than the normal leaf. These dark green islands usually remain alive until the leaf falls. Sooner or later, almost the entire leaf is brown and dead and a great many of the leaves drop off at this stage. In an advanced stage the tree appears as though swept by fire. Before the leaves fall to any great extent, new leaves begin to appear from dormant buds. On other trees, another type of injury is noted. The entire surface both above and below takes on a bronze color with the exception of the main veins and the area immediately adjacent which remains a normal green. The entire tree may become affected or only a few limbs. It is more common, however, to find an entire tree in the same stage of the disease. If a single limb shows the trouble, it is usually one which is more exposed to the sun than the remainder of the tree, and upon examining the foliage on other parts of the tree, it is noticed that the mottled appearance is evident on all of the foliage. One of the peculiar characters of this injury is the fact that not all the trees in an area are affected, but only one here and there. For example, in Springfield where a long row of maples has been planted, all of the same species, there were only three showing the disease, Another peculiar thing is that one tree may show the symptoms described as applying to slightly affected trees while a neighboring tree will show the advanced stage at this season of the year (June 27). The portion of the leaf which dies first varies in different trees. In some cases the dead area is between the main veins and extends down to the petiole. In other cases it is confined to the outer (distal) of the leaf. In some cases it seemed to be confined to the area adjacent to the main veins, while the area between the veins will remain alive for some time.

"Hosts:- So far as observed in Illinois, the leaf scorch seems to be confined to the hard maple (Acer saccharum Marsh) and to the Norway maple. I have observed it only on the hard maple but have definite information that it also occurs on the Norway maple.

"*Cause*:- A careful examination of material from a great many sources failed to reveal any causal organism. The State Field Entomologist examined the material for insects which might cause the trouble and reports that none are to be found, and that there is no evidence of the trouble being due to insects. The fact that the disease is so wide-spread and has appeared for the first time this season, points to the fact that it is due to some climatic condition. Its wide distribution also argues against it being due to escaping gas in the ground or to fumes from industrial plants. There is no evidence that it is caused by winter injury. The bark at the base of the tree and the roots appear to be quite normal. This season has been unusual in many respects. The winter was mild and the buds expanded at an early date. On April 23 and 24, there was a heavy frost with minimum temperatures from twenty-four to thirty-one degrees in all parts of the state. Following this, there was a period of warm, rather dry weather. This was followed in May by a week of rather cold weather during which there was some rain every day. This was the week of May 16-21. It is probable, however, that the injury developed before this week of cold, wet weather, since different observers state that they saw the condition as early as the middle of May. It is probable that the trouble is the result of the low temperatures of April 25 and 26, followed by the relatively warm, dry weather of early May.

"*Distribution*:- The disease has been reported and specimens examined from Springfield, Decatur, Champaign, Urbana, Galesburg, Peoria, and Princeton. I should be pleased to learn anything further concerning the distribution of this disease in the state of Illinois and in other states."

Tar spot, caused by *Rhytisma acerinum* (Pers.) Fr. Although only reported from Connecticut, New Jersey, West Virginia and Minnesota, tar spot no doubt occurred also in Vermont, New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania, Maryland, Kentucky, North Carolina, South Carolina, Arkansas, Michigan, Wisconsin, Iowa, Nebraska, Idaho and Washington. In Preston County, West Virginia, J. Rubinger found a large percentage of the maple trees infected so much so that hardly a tree was free from the disease. Also that it appeared to be far more prevalent than he had ever noted it in New York or Michigan.

Mildew, caused by *Uncinula aceris* (D.C.) Sacc., occurred in Ohio.

The following list of maple species and fungi attacking them was submitted by Dr. J. F. Collins, Pathologist, Office of Forest Pathology, U. S. Department of Agriculture:

Microstroma sp. found on *Acer platanoides* in Ohio and Illinois; on *Acer* sp. in Pennsylvania.

Gloeosporium apocryptum E. & E. reported found on *Acer platanoides* in Maine and New York; on *Acer saccharum* in Pennsylvania, Virginia and Indiana; on *Acer saccharum* in New Jersey.

Sclerotium sp., reported found on *Acer platanoides* in Maryland; on *Acer saccharum* in New York.

Phyllosticta acericola C. & E. reported found on *Acer rubrum* in New Jersey; on *Acer saccharum* in New Jersey.

Cephalothecium roseum Cda. reported found on *Acer* sp. in Kansas.

Fusarium platanoidis Oud. reported found on *Acer* sp. in Virginia

Nectria cinnabarina (Tode) Fr. on *Acer* sp. in Pennsylvania.

Phyllosticta aceris Sacc. reported found on *Acer* sp. in Virginia.

OAK (Quercus spp.)

Anthracnose, caused by *Gnomonia veneta* (S. & S.) Kleb., reported from New Jersey (common), Ohio and Iowa (a trace).

Leaf blister, caused by *Taphrina coerulescens* (M. & D.) Tul. was reported from New York (on *Q. coccinea*), New Jersey (common), Pennsylvania, D. C. (on *Q. velutina*), South Carolina (common - 25% injury), Florida (heavy infection on shade trees at Gainesville) and Mississippi (common at Long Beach).

Brown checked root rot, caused by *Polyporus sulphureus* Fries., was reported from Minnesota as attacking the following oaks: *Quercus coccinea*, *Q. macrocarpa* and *Q. rubra*.

Shoe string root rot, caused by *Armillaria mellea* Vahl., reported from Washington in Lewis County. Earliest report June 27.

White root rot, caused by *Polyporus dryadeus* Fr., reported from Minnesota in Ramsey County on *Q. macrocarpa*. Earliest report July 31.

Soft heartwood rot, caused by *Polyporus obtusus* Berk., reported from Minnesota on *Q. rubra*.

White heart rot, caused by *Fomes everhartii* (E. & Q.) Schrenk, reported from Minnesota in Ramsey County. Earliest report August 10.

Mildew, caused by *Microsphaera alni* (Wal.) Wint., found in Athens and Wayne Counties, Ohio.

Twig blight, caused by *Botryodiplodia ravenelli*, occurred in Ohio.

Shot hole, caused by *Cylindrosporium quercus* Sorok., occurred in Ohio.

Rust, caused by *Cronartium cerebrum* (Pk.) Hedgc. & Long, general in southern part of Georgia, injury ranging from 5 to 25%. Estimated loss about 1%. Earliest report April 1.

Leaf blight, caused by *Gnomonia veneta* (S. & S.) Kleb. (*Gloeosporium nervisequum* (Fckl.) Sacc.), present in New York, New Jersey (on *Q. prinos* and *Q. alba*) and D. C. (on *Q. alba*).

Diplodia longispora C. & Ell., present in Pennsylvania on *Q. prinos*. (J.F.C.)

Canker, caused by *Nectria cinnabarina* Fries., present in Pennsylvania on *Q. rubra*. (J.F.C.)

Dothiorella quercina (C. & Ell.) Sacc., present in Pennsylvania. (J.F.C.)

PINE, White (Pinus strobus)

White pine blister rust, caused by *Cronartium ribicola* Fisher.

"*STATUS OF BLISTER RUST CONTROL IN 1919*

(Prepared by S. B. Detwiler, Office of Forest Pathology)

"White pine blister rust has not been found in the Rocky Mountain and Pacific Coast states, after three years of scouting. In the eastern white pine area it is extending its range and increasing in degree of infection. In Wisconsin and Minnesota, infected Ribes (currants and gooseberries) have been found over an area approximately 150 miles long and 100 miles wide. At an interstate conference held at St. Paul in October, 1919, local control of the disease on the same basis as now practiced in England, was decided upon as the policy for the future. With general blister rust infection at the eastern and the western extremities of the range of *Pinus strobus*, it is only a question of time until the disease reaches Michigan, Pennsylvania, and other parts of the eastern white pine area in which no infections on native growth have as yet been found.

"No evidence of the white pine blister rust has been found in the Pacific Coast and Rocky Mountain States, although fourteen men continued to scout in 1919 as during the past three years. The work has consisted of locating and inspecting the blister rust hosts that have entered this territory from a region where the disease was present; scouting wild plants for the disease; and searching for violations of the Federal quarantine against shipping Ribes and five-leaved pines west of the Great Plains. Several violations of this quarantine were found. If the sugar pine and western white pine are to be kept free from this disease, five-leaved pines, and currant and gooseberry plants from infected regions must be kept out of the West, as provided by the quarantines in both the United States and Canada.

"A single diseased shipment of either pine or Ribes may result in enormous losses in the far West, both to private and Government holdings. The sixty-five species of wild Ribes native to the western half of North America would afford unbroken chains for the dissemination of blister rust. The bushes are so numerous in the white pine and sugar pine regions that the cost of eradication would probably be prohibitive in most localities. A native rust found on Ribes in Colorado, Utah, New Mexico, Arizona, California and Nevada proved to be the piñon blister rust (Cronartium occidentale). This is a Peridermium which has for its alternate host the piñon or nut pines.

"Blister rust infection on pine in the northeastern States is increasing rapidly. In a 41-acre pine lot at Littleton, New Hampshire, containing a total of 5442 white pines averaging 6 inches in diameter, 3014, or 55% of the trees are infected with the rust. This infection is entirely due to wild gooseberries, which average 30 bushes (199 feet of leaf-bearing stem) per acre. The oldest infection found on pine in this region is estimated to have started in 1906, or 13 years ago. Strip surveys a rod wide, totaling 22-5/8 miles in length, recently were run out north, south, east and west from this pine lot across the surrounding country. Out of 2896 pine trees growing on these strips, 25.5% have been attacked by the disease. In addition, 1461 pines were inspected in 33 widely scattered quarter-acre plots, and 41% were found infected. Thus, in an area 8 miles wide and 9 miles long, a total of 9,799 pines were examined and 4,359 trees, or 44%, found diseased.

"Since the strip lines give a fair average, it appears that at least one-fourth of the pines in 72 square miles covered by the survey in the Littleton region are infected with blister rust. On another strip line 30-7/8 miles long, run from Lisbon to Woodsville and Piermont, N. H., 2.4% of 6,758 trees were diseased. This shows that infection is progressing rapidly, and that pine owners should lose no time in destroying currant and gooseberry bushes in the vicinity of their pines.

"Blister rust control through destruction of currant and gooseberry bushes has been tried experimentally since 1916, in cooperation with the New England States and New York. The results show that effective control of the disease is possible, and that cost is low in comparison with the value of the pine protected. On four control areas from which currant and gooseberry bushes were removed in 1916 and early in 1917, no new pine infections were found this year. Under trained supervision, unskilled laborers quickly attain efficiency in finding and destroying 95% or more of the wild currant and gooseberry bushes the first time over the area. In 1919, 1070 accurate checks were made to determine thoroughness of eradication by the crews. The crews made 642 checks, in which 246.254 bushes, or 96.4%, were uprooted in the first working, 8095 bushes the second working, 905 the third, 125 the fourth, and 10 the fifth time over the ground. On eight areas worked in previous years, totaling 2485 acres, 155,059 wild Ribes (95.5%) were found in the original working and only 7,310 bushes, (of which 3121 were sprouts and seedlings) were found in going over the areas in 1919. On an acre basis, 62 wild Ribes bushes were destroyed in the first working, 2 bushes were missed, and 1 new plant developed from seeds or sprouts.

"Where only 87% of the wild Ribes bushes were removed in the first working, these bushes bore 96.6% of the leaves. The leaves on 2194 bushes were counted in this test. In the first working 94,429 leaves were destroyed, and in three subsequent workings, only 3094 leaves were found. Measurements of the annual growth of 836 gooseberry bushes show an average height growth of 5 inches per year for 4 years. Other counts show that less than 5% of the gooseberry bushes produce fruit, even in favorable crop years. Intensive study of Ribes seedlings on small plots show that they summer kill as well as winter kill, so that only a very small percentage live through the first year.

"Results of scientific studies by the Office of Forest Pathology on the distribution of sporidia and the distance that infection has actually occurred upon pines from known infected Ribes, indicate that the Ribes-free zone should be, under average conditions, 200 to 300 yards in width. Tests of the longevity of the sporidia showed that they remained viable for a period of less than ten minutes where the humidity was 90. Cultivated black currant (*Ribes nigrum*) is especially susceptible to the blister rust, and the large volume of sporidia produced on the leaves of this species may cause severe pine infection to a greater distance than 300 yards. A plantation of approximately 3000 cultivated Ribes, containing about 600 bushes of black currants, has apparently infected native pines to a distance of 1.6 miles from the bushes. In another infection area where there were only 6 cultivated Ribes, 3 of them black currants, there was no appreciable amount of pine infection beyond 130 feet from the Ribes.

"The cost per acre of Ribes eradication is low. The state crews eradicated Ribes from 252,114 acres in 1919, at an average cost of 42 cents per acre for labor, or 54 cents per acre including supervision. In 1918 the average cost, including supervision, was 66 cents per acre on 135,239 acres. This reduction in cost was accomplished through the application of ecological knowledge in locating wild Ribes in regions where they are not evenly distributed. By this means, the average cost per acre in New England was reduced from 44 cents in 1918 to 24 cents this year.

"Three years' experimental work in spraying Ribes with various chemicals shows that dip oil and fuel oil are effective in killing Ribes. It appears that this method will greatly reduce cost of eradicating Ribes where the wild bushes are very numerous.

"In Massachusetts, local cooperators furnished $1075 for cooperative eradication of Ribes. The sympathetic attitude of the public toward blister rust control is evidenced by the fact that in New Hampshire 21,191 cultivated Ribes were destroyed, and compensation was asked by only three owners. Towns, associations, and individuals in New York, New Hampshire and Massachusetts subscribed $21,642 for cooperative control. The necessity for developing local control of the blister rust is apparent from the rate of increase of the disease in the native pine stands, and the demonstrated practicability of Ribes eradication fully justifies pine owners in undertaking this work on a large scale."

PINE (Pinus spp.)

Rusts, caused by *Cronartium filamentosum* (Pk.) Hedge. & Long, and by *C. cerebrum* (Pk.) Hedge. & Long, were reported respectively from Washington (earliest report Aug. 6 in Stevens Co.) and from Georgia. (Generally in the southern section of state. Injury ranged from 5-25% with a 1% estimated loss. Earliest report April 1 - weather favorable to the disease.)

Mistletoe (*Razoumofskya* sp.) was reported by Dr. Heald and Mr. Dana from Washington in Stevens County, earliest report August 5.

Leaf cast, caused by *Lophodermium pinastri* (Schr.) Chev., was reported from Washington in Pierce County, April 1.

Canker, caused by *Cenangium ferruginosum* Fr. (*C. abietis* (Pers.) Rehm.), occurred in Ohio on the white pine.

Blight, non-parasitic, reported from Connecticut. Apparently less than usual. The type was mostly that of sun scorched. Reported from Fairfield, Litchfield and New Haven Counties.

A root rot, cause undetermined, is under investigation in Ohio. Found in Wayne County.

PINE, Austrian (Pinus austriaca)

Twig blight, caused by Physalospora cydoniae Arnaud (Sphaeropsis malorum Berk.), reported from Connecticut. Of rare occurrence, being found only in Fairfield, New London and Washington Counties. According to Dr. Clinton it apparently follows winter injury to the young twigs.

Die-back, caused by Diplodia sp., was reported by Dr. Mel. T. Cook as having been very destructive to the trees during the year in New Jersey.

Winter injury in Connecticut killed the young buds and twigs along the shore, especially in exposed places. Reported from Fairfield, New London and Washington Counties.

PINE, Scotch (Pinus sylvestris)

Rust, caused by Cronartium comptoniae Arth., occurred in Ohio.

Phoma geniculata (B. & Br.) Sacc., present in New Hampshire. (J. F. C.)

POPLAR (Populus spp.)

Rust, caused by Melampsora spp., reported from Oklahoma (Present in Garvin, Jefferson, Logan, Oklahoma and Payne Counties. Earliest report in August. Considerable moisture made conditions favorable for the disease.), Ohio, Iowa (Common), Minnesota (Earliest report September 10), and New Mexico. (The leaves were badly affected. The disease was general over the entire county of Dona Ana.)

Canker, caused by Cytospora chrysosperma (Pers.) Fr., was reported from Colorado and New Mexico. Abundant and severe in Colorado. In some sections of the state at least 50% of the trees were lost. Since the poplar is an important tree in Colorado both for shade purpose and for wind breaks, this disease is a serious menace. Canker was moderately severe in Bernalillo and Dona Ana Counties in New Mexico, where the estimated loss was about 2%. In Colorado the earliest report was in May and in July for New Mexico.

Twig blight, caused by Dothichiza populea Sacc. & Briard, was reported from New Jersey, (Occasional and of some importance) and Minnesota (Found in Steele County June 17).

Leaf spot, caused by Marssonia populi (Lib.) Sacc. and Marssonia castagnei (D. & M.) Sacc., reported respectively from New Jersey (Common) and Ohio.

Powdery mildew, caused by Uncinula salicis (D.C.) Wint., reported from Lake County, Minnesota.

Phoma populi Pk. reported from Minnesota. Moderately severe in Rice County.

Fusicladium radiosum (Lib.) Lind, present in Maine on P. alba. (J. F. C.)

SEQUOIA (Sequoia washingtoniana)

Botrytis douglassi Tub. occurred in Ohio.

Cercospora sequoiae E. & E. present in D. C. (J. F. C.)

SUMAC (Rhus spp.)

Leaf spot, caused by Phyllosticta sp., reported from Stevens County, Minnesota, July 28 on Rhus glabra.

Septoria leaf spot, caused by Septoria irregularis Pk., reported from Minnesota, present in Hennepin (Earliest report July 26) and Ramsey Counties.

Rust, caused by Pileotaria toxicodendron Arth., reported from Minnesota, earliest report September 4, in Ramsey County.

Canker, thought to be caused by Physalospora cydoniae Arnaud (Sphaeropsis malorum Berk.), occurred in Ohio.

SYCAMORE (Platanus spp.)

Anthracnose, caused by Gnomonia veneta (S. & S.) Kleb. (Gloeosporium nervisequum (Fckl.) Sacc.), reported from New Jersey, Maryland, Georgia, Oklahoma, Arkansas, Ohio, Iowa, Nebraska and Kansas. Except for Ohio and Iowa the disease was quite general. Especially injurious in Arkansas; at times destructive in New Jersey nurseries. The use of Bordeaux mixture in Oklahoma gave good results.

Earliest reports: April, Arkansas; May 1, Georgia; June 9, Ohio; and July Oklahoma.

TULIP TREE (Liriodendron tulipifera)

Leaf spots, caused by Phyllosticta liriodendrica Cke., present in Maryland (J. F. C), and Gloeosporium liriodendri E. & E., present in Ohio. (J. F. C.)

UMBRELLA TREE (Melia sp.)

Texas root rot, caused by Ozonium omnivorum Shear, reported from Texas by Dr. Taubenhaus as prevalent, producing an estimated loss of about 10%. Weather conditions favorable.

WALNUT (Juglans sp.)

Leaf spot, caused by Marssonia juglandis (Lib.) P. Magnus, present in Pennsylvania. (J. F. C.)

WILLOW (Salix spp.)

Leaf rust, caused by Melampsora spp., was reported from Connecticut, (Earliest report September 18, New Haven County), Ohio (M. bigelowi Thum), Minnesota (M. bigelowi Thum reported on Salix longifolia and Salix sp.. Earliest report Kanabec County, May 12 on the stem of the plant. Found in Hennepin, Washington, Chisago and Kanabec Counties), and Washington (Present in Yakima County).

Rust, caused by Melampsora salicis albae Kleb., according to Dr. Melhus, was common in Iowa.

Powdery mildew, caused by Uncinula salicis (D. C.) Wint., reported from Ohio, Minnesota (A trace in Lake County), Iowa (Common), and Washington (Moderately severe in Pierce County).

Tar spot, caused by Rhytisma salicinum Fries., was reported from Ohio and Minnesota (No doubt quite general, earliest report from Washington County August 3).

Wood rot, caused by Daedalea confragrosa (Bolt.) Pers., was reported from Minnesota.

DISEASES OF ORNAMENTALS

AMPELOPSIS sp.

Leaf spot, caused by Guignardia bidwellii (E) V. & R., was reported from New Jersey, Rhode Island (J. F. C.), Connecticut, and Minnesota, where it was found in several of the southeastern counties.

Powdery mildew, caused by Uncinula necator (Schw.) E. & E. (U. ampelopsidis Peck.), reported from Minnesota, of local occurrence.

ASTER (Aster sp.)

Fusarium wilt, caused by Fusarium sp. The range for 1919 extended across the northern half of the United States from the Atlantic to the Pacific Coasts. In 1918 but two states reported its occurrence while in 1919 there were eight noting its presence,- Connecticut (Fairfield and New Haven Counties), Ohio (Franklin, Miami and Wayne Counties), Indiana (Tippecanoe County), Minnesota (Goodhue County), Kansas (Crawford County), North Dakota (Cass County), Nevada (Washoe County), and Washington (King County).

The disease was severe in Kansas (60% injury). In Nevada all the plants in the bed were practically killed. In Minnesota there was slight injury ranging from 2-5%. Earliest reports were July 11, Kansas; July 22, Connecticut; August, Ohio; July 21, Minnesota; August 1, Washington.

Powdery mildew, caused by Erysiphe cichoracearum D. C. (E. asterum Sch.), reported from Rice County, Minnesota on July 19.

Yellows, cause undetermined, more or less prevalent every year in New Jersey. One occurrence reported from Minidoka County, Idaho.

Rhizoctonia was reported as affecting asters in King and Pierce Counties, Washington. Earliest report July 7.

An undetermined disease attacked the asters in Crawford County, Kansas, and caused moderate injury.

BEGONIA (Begonia sp.)

Root knot, caused by Heterodera radicicola (Greef.) Müller., reported from Wayne County, Ohio and Marion County, Indiana (April 14).

Leaf spot, cause undetermined, reported from Pullman, Washington.

BOX (Buxus sp.)

Fusarium roseum Lk. present in North Carolina (J. F. C.)

CARNATION (Dianthus caryophyllus)

Rust, caused by Uromyces caryophyllinus (Sch.) Wint., reported from Connecticut (New Haven County), New Jersey (common), Oklahoma (Payne County), Ohio (Crawford, Fairfield and Franklin Counties), Minnesota (Ramsey County), and Nevada (Washoe County), apparently not serious. Appeared on greenhouse stock in Oklahoma and Minnesota. In Connecticut the Pink and White Enchantress were rusted.

Stem rot, caused by Corticium vagum B. & C., common in New Jersey, but not serious.

Stem rot, caused by Botrytis sp., occurred in Ohio.

Root knot, caused by Heterodera radicicola (Greef.) Müller, a trace in Grayson County, Texas.

CHRYSANTHEMUM (Chrysanthemum hortorum)

Powdery mildew, caused by Erysiphe cichoracearum D. C. (Oidium chrysanthemi), reported from South Carolina (common, 40% injury, 5% estimated loss), Ohio (Wayne County), Minnesota (Kanabec and Ramsey Counties - earliest report Nov. 1), and Washington (Erysiphe species questioned, earliest report July 30 - slight appearance in Snohomish County).

Rust, caused by Puccinia chrysanthemi Roze., reported from Grays Harbor County, Washington, June 11 - unimportant.

Ray blight, caused by Ascochyta chrysanthemi Stev., reported from Oconee, Orangeburg and Richland Counties, South Carolina.

Sooty mold, caused by Fumago sp., reported from Texas. Unimportant.

Leaf blight, caused by Cylindrosporium chrysanthemi E. & D., reported from Connecticut in New Haven County.

Leaf spot, caused by Septoria chrysanthemella Cav., reported from Navarro County, Texas.

Mosaic reported from Ohio.

CLEMATIS (Clematis sp.)

Root knot, caused by Heterodera radicicola (Greef.) Müll., reported from Washington. Earliest report March 15 at Spokane.

DAHLIA (Dahlia sp.)

Blight, cause unknown, reported by C. H. Philpott to have been found in Henry and Jasper Counties, Missouri, and by C. W. Hungerford from Jefferson County, Idaho.

EVONYMUS (Evonymus sp.)

Leaf spot, caused by Exosporium concentrichum (Heald) Wolf., was common in Texas.

Powdery mildew, caused by Microsphaera evonymi (D. C.) Sacc., reported from Minnesota. Earliest appearance August 10.

GERANIUM (Geranium sp.)

Leaf spot, caused by Bacterium erodii Lewis, reported from Ohio.

Downy mildew, caused by Plasmopara geranii (Peck.) Berlese and de Toni., reported from Iowa. Found at Stacyville June 12 on a wild species.

Powdery mildew, caused by Sphaerotheca humuli (D. C.) Burr., reported on G. maculatum June 18 from Ramsey County, Minnesota.

Rhizoctonia, caused by Rhizoctonia sp., reported from Pierce County, Washington. Earliest report April 11.

Rust, caused by Uromyces geranii (de C.) Otth. & Wart., reported on G. maculatum June 4 from Mower County, Minnesota. Also found in Hennepin and Ramsey Counties.

"Dropsy" (physiological) reported from Wayne County, Ohio.

GOLDEN ROD (Solidago sp.)

Powdery mildew, caused by Erysiphe cichoracearum D. C., reported on S. canadensis August 10 from Ramsey County, Minnesota, also found in Chisago County.

Rust, caused by Puccinia caricis-solidaginis Arth. on S. canadensis, reported from Anoka, Isanti, Hennepin, Ramsey, Todd, Wadena and Washington Counties, Minnesota. Earliest report June 20; on S. serotina reported from Chisago County, Minnesota, September 5.

GOLDEN GLOW (Rudbeckia laciniata)

Powdery mildew, caused by Erysiphe cichoracearum (D. C.) (E. lamprocarpa Kickx.), reported August 18 as moderately severe in McLeod County, Minnesota.

HOLLY (Ilex sp.)

Leaf spot, caused by Phyllosticta opaca E. & E., present in Pennsylvania. (J. F. C.)

HOLLYHOCK (Althea rosea)

Root rot, caused by Ozonium omnivorum Shear, reported from Texas. Prevalent, estimated loss about 10%.

HONEYSUCKLE (Lonicera sp.)

Powdery mildew, caused by Microsphaera alni (Wal.) Salm., was reported from Minnesota on Lonicera sempervirens (earliest report July 31) and on Lonicera tatarica (earliest report June 28 in Ramsey County).

HYDRANGEA (Hydrangea sp.)

Leaf spot, caused by Septoria hydrangeae Bizz., occurred in Ohio.

IRIS (Iris sp.)

Leaf spot, caused by Didymellina iridis (Desm.) H. (Heterosporium gracile (Wallr.) Sacc.), reported from Connecticut, Ohio and Minnesota.

Rot, caused by Botrytis sp., reported June 6 from King County, Washington.

Blight, cause undetermined, reported July 30 from Snohomish County, Washington.

IVY, English (Hedera sp.)

A leaf spot, cause unknown, reported from Washington. Earliest report July 24 in Pierce County, moderately severe.

KALMIA (Kalmia sp.)

Leaf spot, caused by Phyllosticta sp., present in New Jersey. (J. F. C.)

LARKSPUR (Delphinium sp.)

Powdery mildew, caused by Erysiphe polygoni D. C. (E. communis Grev.), reported in August from Ramsey County, Minnesota.

LILAC (Syringa spp.)

Blossom blight, cause bacterial, reported from Delaware.

Frost injury reported from Washington. Moderately severe in Okanogan and Whitman Counties. Earliest report June 18.

Leaf spot, caused by *Phyllosticta halstedii* E. & E., reported from New Jersey, of common occurrence.

Powdery mildew, caused by *Microsphaera alni* (Wal.) Salm., reported from Connecticut, (moderately severe in New Haven and New London Counties), New Jersey (very common throughout the state), Delaware, Maryland, South Carolina (common), Oklahoma (local), Ohio (more prevalent than usual, reported from 19 counties), and Iowa (very common).

PEONY (Paeonia sp.)

Leaf blotch, caused by *Cladosporium paeoniae* Pass., reported from Connecticut and Minnesota. Local in both states.

Blight, caused by *Botrytis* sp., reported from Ohio (Clinton, Franklin, Montgomery and Tuscarawas Counties) and Minnesota.

Mosaic (non-parasitic) reported from Ohio and Washington.

PHLOX (Phlox sp.)

Powdery mildew, caused by *Erysiphe cichoracearum* D. C., reported from Connecticut. Present in Fairfield and New Haven Counties. One observer wrote that the colored varieties were badly affected while the white varieties were free from the disease.

Powdery mildew, caused by *Sphaerotheca humuli* (D.C.) Burr., occurred in Ohio.

POPPY (Papaver sp.)

Blossom blight, cause uncertain, reported May 12 from King County, Washington.

PRIVET (Ligustrum sp.)

Anthracnose, caused by *Glomerella cingulata* (Stoneman) Sp. and von S. (*Gloeosporium cingulatum* Atk.), was reported from Texas (prevalent, estimated loss about 1% - reported from Bell County), Ohio and Indiana.

Root rot, caused by *Ozonium omnivorum* Shear, reported from Ellis County, Texas. Estimated loss about 1%.

Leaf spot, caused by *Exosporium concentricum* Heald & Wolf, reported from Harris County, Texas.

Winter injury, caused by low temperature and snow, was very much less in Ohio than what usually occurs.

ROSE (Rosa spp.)

Powdery mildew, caused by *Sphaerotheca pannosa* (Wal.) Lev., reported from Connecticut, New Jersey, Delaware, Virginia, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Texas, Arkansas, Ohio, Indiana, Minnesota, Missouri, Nebraska, Colorado, Nevada, Idaho, Washington and Hawaii. The disease was more prevalent than in 1917 and 1918, of common occurrence in all the states reporting it except in Nebraska and Colorado. Considerable injury occurred in New Jersey, Delaware, South Carolina, Georgia, Texas, Oklahoma, Arkansas and Ohio. The wet weather conditions which prevailed in the states reporting, were favorable except Colorado where dry conditions were experienced.

Dates of appearance:

1917		1918		1919			
Mar.	- La.	Mar.	- La.	Feb. 19	- Wash.	May 9	- Fla.
May	- Miss.	Mar. 29	- Miss.	Mar.	- La.	May 17	- Okla.
June	- Okla.	July 13	- Mo.	Apr. 1	- Ga.	June 3	- Ohio
July 27	- Ohio	Oct.	- Okla.	May	- Ark.	June 26	- Colo.
Aug. 16	- N. Y.			May	- S. Car.	June 28	- Minn.
				May 8	- Ala.	July 10	- Conn.

Crimson Rambler and ramble varieties were the most susceptible in Oklahoma and Indiana. In Connecticut the disease was worse on the Dorothy Perkins. The Killarney was also quite susceptible in Indiana.

In Connecticut a conspicuous white felt was formed on the hips, and the blossom development was somewhat interfered with.

Lime-sulfur was reported to have given fair results in South Carolina.

Black spot, caused by *Diplocarpon rosae* Wolf. (*Actinonema rosae* (Lib.) Fr.), was reported of general occurrence in the following states: Connecticut, New Jersey, Delaware, South Carolina, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Ohio, Indiana, Minnesota and Washington. In Oklahoma only a trace appeared. The per cent of injury in South Carolina amounted to about 90%, resulting in an estimated loss of 3% of the blooms. In Delaware there was a 3%, and in Arkansas a 2%, injury to the plants. Although the injury ran high in Louisiana the loss was very slight. The disease was present to a considerable extent in a greenhouse in Indiana. Moist weather conditions were favorable to the disease in South Carolina, Florida and Arkansas.

Dates of appearance:

1919			
Apr. 1	- Ohio	June	- S. Car.
Apr. 26	- Ala.	June 6	- Wash.
May 21	- Fla.	June 24	- Minn.
May 28	- La.	Sept.	- Okla.

It was noted in Connecticut that the tender out-of-door plants and those grown in greenhouses seemed more susceptible to the disease than the more hardy variaties.

Rusts, caused by *Phragmidium* spp., reported from Connecticut, Arkansas, Ohio, Minnesota, Iowa, Nevada and Washington, of common occurrence in all states reporting except in Ohio where it is only occasionally met. It appeared May 7 in Minnesota, May 26 in Washington and June 19 in Connecticut.

Crown gall, caused by *Bacterium tumefaciens* S. & Town., reported from Connecticut (caused a moderate amount of damage in New Haven and Middlesex Counties), New Jersey (frequent and sometimes injurious), Ohio (present in Richland County), Minnesota (present in Itasca County Aug. 2) and Washington (earliest report Sept. 10 - present in Skagit County).

Anthracnose, caused by *Gloeosporium rosae* Hals., reported from New Jersey (common, not serious) and Ohio.

Bud rot, caused by *Botrytis* sp., reported from Washington, present in King and Pierce Counties. Earliest report June 18.

Cane blight, caused by *Leptosphaeria coniothyrium* (Fckl.) Sacc., reported from New Jersey. Common, produces serious injury at times.

Leaf spot, caused by *Phyllosticta rosicola* Mass., reported from New Jersey. Abundant.

Winter injury, reported from Washington in Thurston and Whitman Counties.

Frost blister, quite general in Washington. First report May 14.

Canker, cause undetermined, reported from Washington. Occurred in Snohomish County, earliest report June 3.

SALVIA (Salvia sp.)

Cladosporium aphidis Thüm. reported from Ohio.

SNAPDRAGON (Antirrhinum majus)

Rust, caused by Puccinia antirrhini Diet. & Holw., was reported from Pennsylvania, Ohio, Missouri, Nebraska and Washington. In Pennsylvania the amount of injury ranged from slight to very severe and in Missouri and Nebraska those grown in greenhouses were injured considerably.

Anthracnose, caused by Colletotrichum sp., was reported from Pennsylvania (general, injury ranged from 5-10% - earliest reported appearance July in Luzerne County).

SUNFLOWER (Helianthus spp.)

Powdery mildew, caused by Erysiphe cichoracearum D. C., was reported from Minnesota on H. annuus, H. hirsutus and H. maximiliani.

Rust, caused by Puccinia helianthi Schw., reported from New Jersey, Oklahoma, Minnesota and California. In Minnesota found on H. annuus and H. maximiliani.

Downy mildew, caused by Plasmopara halstedii (Farl.) B. & de T., occurred in Iowa.

Wilt, caused by Sclerotinia sp., reported from Pierce County, Washington. Moderately severe.

SWEET PEA (Lathyrus odoratus)

Powdery mildew, caused by Erysiphe polygoni D. C., reported from Delaware, South Carolina and Minnesota. Of common occurrence in Delaware. Local in South Carolina. Earliest reported appearance in Minnesota, Aug. 19.

Pod and root rot, caused by Thielavia basicola (B. & Br.) Zopf., reported September 18 from Hamilton County, Ohio.

Stem and root rot, caused by Fusarium sp., was severe in Dodge County, Minnesota.

Streak, caused by Bacillus lathyri M. & T., was very common in Delaware, producing a 50-60 crop injury.

Mosaic, cause undetermined, reported from Delaware, 1-2% crop injury.

SYRINGA (Philadelphus sp.)

Phoma landeghemiae (Nitsch.) Sacc., present in New York. (J. F. C.)

TULIP (Tulipa sp.)

Leaf spot and blight, caused by Botrytis sp., which followed insect injury was reported from King and Pierce Counties, Washington. Moderately severe. Earliest appearance May 2.

White rot, caused by Sclerotinia fuckeliana (De.B.) Fckl., occurred in Ohio.

White spot, cause undetermined but thought to have been caused by smoke or late frost, appeared in Connecticut in early May. There was one report of a with small white spots. The leaves were less affected. A late frost, which occurred in May, might have been the cause. The worst case though was from smoke of a nearby steel converter.

VERBENA (Verbena sp.)

Powdery mildew, caused by Erysiphe cichoracearum D. C., was reported from Minnesota on Verbena hastata and Verbena urticaefolia. Earliest report July 24. Found in Hennepin, Anoka, Ramsey, McLeod, Chisago and Washington Counties.

VIOLET (Viola spp.)

Leaf spot, caused by Phyllosticta violae Desm., reported from Florida (occasionally found, also caused by Cercospora violae Sacc., which is common in Florida.

Rust, caused by Puccinia violae (Schum.) D. C., was reported June 26 from Ramsey County, Minnesota on Viola pubescens; and Nigredo pedatata (Schw.) Arth., was reported May 30 from Hennepin County, Minnesota on Viola sororia.

Root knot, caused by Heterodera spp., was reported May 17 from Bryan County, Oklahoma.

Root rot, caused by Sclerotium rolfsii Sacc., was abundant in Alabama.

DISEASES OF MISCELLANEOUS PLANTS

CASTOR BEAN (Ricinus communis)

Root rot, caused by Ozonium omnivorum Shear, reported from Texas (epidemic in Cameron and Hildago Counties).

COFFEE (Coffea sp.)

Black root rot, caused by Rosellinia sp., was reported present in Porto Rico by J. Matz. Occurred in spots, injury small except where individual trees were killed.

DANDELION (Taraxacum taraxacum)

Rust, caused by Puccinia taraxaci Plow., of general prevalence in Minnesota. Twelve counties reporting its occurrence, earliest report May 30 in Ramsey County.

Powdery mildew, caused by Sphaerotheca humuli var. fuliginea (Schlect.) Lahn. (Sphaerotheca castagnei), reported from Minnesota (Hennepin, Isanti, Lake, McLeod and Ramsey Counties, earliest report June 9 in Ramsey County).

LACTUCA PULCHELLA

Rust, caused by Puccinia hemisphaerica (Peck.) E. & E., reported from Hennepin, Isanti and Ramsey Counties, Minnesota. Earliest report June 18.

LEPIDIUM EPATALUM

Downy mildew, caused by Peronospora parasitica (Pers.) DeBary, was reported to have been very common in Iowa.

NETTLE (Urtica dioica)

Rust, caused by Puccinia caricis (Schum.) Rebent, reported from Freeborn, Hennepin, Mower and Ramsey Counties, Minnesota. Earliest reported appearance May 30.

SHEPHERD'S PURSE (Capsella bursa-pastoris)

White rust, caused by Albugo candida (Pers.) Roussel, was reported from Mower and Ramsey Counties, Minnesota to have been moderately severe.

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124